

**Irritation:** Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons. May cause irritation of the gastrointestinal tract.  
**Reproductive effects:** No information is available and no adverse reproductive effects are anticipated.  
**Developmental effects:** No information is available and no adverse developmental effects are anticipated.  
**Target Organ:** Eyes, skin, respiratory system, blood, liver urinary tract, & gastrointestinal tract (GI).

## SECTION 12 – ECOLOGICAL INFORMATION

**Ecotoxicity effects:** Dissolves slowly in water. Harmful to aquatic life at low concentrations.  
 Environmental Effects: Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.  
**Persistence/Degradability:** Some water resistance but soluble with extended time periods.  
**Mobility in Environmental media:** Dissolves slowly in water.

## SECTION 13 – DISPOSAL CONSIDERATIONS

**Waste Disposal Method:** Burn under supervision of an expert at an explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an Orica Technical Representative.

## SECTION 14 – TRANSPORT INFORMATION

**DOT Proper Shipping Name:** Explosive, blasting type E  
**Hazard Class:** 1.5D  
**UN-No:** UN0332  
**Packing group:** II  
**TDG Proper Shipping Name:** Explosive, blasting type E  
**Hazard Class:** 1.5D  
**UN-No:** UN0332  
**Packing group:** II

**Transportation Emergency Telephone Number:** 1-877-561-3636 or CHEMTREC: 1-800-424-9300

## SECTION 15 – REGULATORY INFORMATION

**CANADIAN CLASSIFICATION:** This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

**WHMIS hazard class:** This product is an explosive and is not regulated by WHMIS.

### USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements, Ammonium Nitrate (6484-52-2) Petroleum distillates, hydrotreated light (64742-47-8) & Mineral Oil (64742-53-6).

### SARA 311/312 Hazardous Categorization

**Acute Health Hazard:** Yes  
**Chronic Health Hazard:** Yes  
**Fire Hazard:** Yes  
**Reactive Hazard:** No  
**Sudden Release of Pressure Hazard:** Yes

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

**Other Regulations/Legislations which apply to this product:** New Jersey Right-to-Know, Pennsylvania Right-to-Know, Massachusetts Right-to-Know, Rhode Island Right-to-Know, Florida, New Jersey Special Health Hazard Substance List, Minnesota Hazardous Substance List, California Director's List of Hazardous Substances, California Proposition 65.

**TSCA:** Complies

**DSL:** Complies

**NDSL:** Complies

The components in the product are on the following international inventory lists:

Chemical Name	TSCA	DSL	NDSL	ENCS	EINECS	ELINCS	CHINA	KECL	PICCS	AICS
Ammonium Nitrate	X	X	-	X	X	-	X	X	X	X

Petroleum distillates, hydrotreated light	X	X	-	-	X	-	X	X	X	X
Mineral Oil	X	X	-	-	X	-	X	X	X	X

Legend: X – Listed

## SECTION 16 – OTHER INFORMATION

Prepared by: Safety Health & Environment  
303-268-5000

Preparation Date: 25-Mar-2006  
Revision Date: 18-Jul-2008

The information contained herein is offered only as guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

End of MSDS



# Material Safety Data Sheet

Preparation Date: 25-Mar-2006

Revision Date: 16-Jul-2008

Revision Number: 1

## SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

**Supplier(s):**

Orica Canada Inc.

Maple Street

Brownsburg, QC

For MSDS Requests: 1-450-533-4201

Orica USA Inc.

33101 E. Quincy Avenue

Watkins, CO 80137-9406

For MSDS Requests: 1-303-268-5000

**Product Name:**

Fortel™ Pro & Fortel™ Pro D

**Product Code:**

105

**Alternate Name(s):**

Apex™ Ultra & Apex™ Ultra II

**UN-No:**

UN0332

**Recommended Use:**

A booster sensitive emulsion explosive.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL: THE ORICA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636. IN THE U.S. CALL: CHEMTREC 1-800-424-9300. IN THE U.S.: FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF 1-800-800-3855. FORM ATF F 5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

## SECTION 2 – HAZARD IDENTIFICATION

**Emergency Overview:**

Risk of explosion by shock, fire of other sources of ignition. May cause skin irritation and/or dermatitis. Irritating to eyes. Harmful if swallowed. Oxidizing agent. May cause methemoglobinemia. May cause liver damage. May cause kidney damage.

**Appearance:**

White, viscous putty-like

**Physical State:**

Viscous, putty-like

**Odor:**

Odorless to slight diesel

## SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

**Chemical Name**

Ammonium Nitrate

Sodium Nitrate

Mineral Oil

**CAS-No**

6484-52-2

7631-99-4

64742-53-6

**Weight %**

50-90

0-15

1-6

## SECTION 4 – FIRST AID MEASURES

**General Advice:**

In case of accident or if you feel unwell, seek medical advice IMMEDIATELY (show the product label where possible).

**Eye Contact:**

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediate medical attention is required.

**Skin Contact:**

Wash off immediately with soap and plenty of water, removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

**Inhalation:**

Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.

**Ingestion:**

Immediate medical attention is required. Do not induce vomiting. Clean mouth with water and afterwards drink plenty of water. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Never give anything by mouth to an unconscious person.

**Notes to physician:**

Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

## SECTION 5 – FIRE-FIGHTING MEASURES

Flammable properties:	Not itself combustible but assists fire in burning materials. The product does not flash. Rate of burning: does not sustain burning at atmospheric pressure.
Suitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Evacuate surrounding areas. When controlling fire before involvement of explosives, fire-fighters should wear positive pressure self-containing breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate.
Unsuitable extinguishing media:	DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Attempts to smother a fire involving this product will be ineffective as it is its own oxygen source. Smother this product could lead to decomposition and explosion. This product is more sensitive to detonation if contaminated with organic or oxidisable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible.
Specific hazards arising from the chemical:	This product is a high explosive with mass detonation hazard. DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors.
Protective equipment and precautions for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

## SECTION 6 – ACCIDENTAL RELEASE MEASURES

Methods for containment:	Contain or absorb leaking putty with sand or earth or other suitable substance.
Methods for cleaning up:	Avoid the use of metal tools containing iron and/or copper. Be careful to avoid shock, friction, and contact with grit. Collect product for recovery or disposal. For release to land, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Collect contaminated soil and water, and absorbent for proper disposal. Notify applicable government authority if release is reportable or could adversely affect the environment.
Other information:	Deactivating chemicals: Detergents will break up emulsions if mixed in.

## SECTION 7 – HANDLING AND STORAGE

Handling:	This product is an explosive and should only be used under the supervision of trained personnel. The use of coveralls is recommended. Use good industrial hygiene and housekeeping practices. Keep away from open flames, hot surfaces and sources of ignition.
Storage:	Store under moderate temperatures recommended by a technical services representative. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, spark and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials; combustibles, and sources of heat. Keep away from incompatibles. Ideal storage temperature is 10-27 °C (50-80 °F). Do not expose sealed containers to temperatures above 40 °C (104 °F).

## SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium Nitrate	10 mg/cu m (nuisance dust)	NA	
Mineral Oil	5 mg/m <sup>3</sup>	5 mg/ m <sup>3</sup>	

Other exposure guidelines:	Ammonium Nitrate: ORICA Guideline 5 mg/m <sup>3</sup> (internal TWA)
Engineering Measures:	No information available.
Personal Protective Equipment	
Eye/Face Protection:	Tightly fitting safety goggles.
Skin Protection:	User should verify impermeability under normal conditions of use prior to general use. Impervious butyl rubber gloves.
Respiratory Protection:	In case of insufficient ventilation wear suitable respiratory equipment. A NIOSH-approved respirator, if required.



**Hygiene Measures:**

Handle in accordance with good industrial hygiene and safety practice. Recommendations listed in this section indicate the type of equipment, which will provide protection against over exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

**SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance:</b>	White, viscous putty-like	<b>Odor:</b>	Odorless to slight diesel
<b>Physical State:</b>	Putty-like	<b>Viscosity:</b>	No information available
<b>pH:</b>	not available	<b>Flash Point:</b>	Not applicable
<b>Autoignition Temperature:</b>	230-265 °C/ 446-509 °F	<b>Boiling Point/Range:</b>	100 °C / 212 °F
<b>Melting Point/Range:</b>	0-167 °C/ 32-333 °F (Ammonium Nitrate)	<b>Flammable Limits (Upper):</b>	Not applicable
<b>Flammable Limits (Lower):</b>	Not applicable	<b>Explosion Power:</b>	No data available
<b>Specific Gravity:</b>	1.25 g/cc	<b>Water Solubility:</b>	Insoluble in water
<b>Other Solubility:</b>	Slightly soluble in standard organic solvents.	<b>Vapor Pressure:</b>	0 mmHg @ 20 °C
<b>Oxidizing Properties:</b>	Oxidizer	<b>Partition Coefficient (n-octanol/water):</b>	No data available

**SECTION 10 – STABILITY AND REACTIVITY**

<b>Stability:</b>	Stable under normal conditions. Decomposition Temperature: Ammonium Nitrate will spontaneously decompose at 210 °C (410 °F).
<b>Conditions to avoid:</b>	Keep away from open flames, hot surfaces and sources of ignition. Not expected to be sensitive to static discharge. Not expected to be sensitive to mechanical impact.
<b>Incompatible materials:</b>	Avoid oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles. Strong oxidizing and reducing agents.
<b>Hazardous decomposition products:</b>	The following toxic decomposition products may be released. At temperatures above 210 °C, decomposition may be explosive, especially if confined. Nitrogen oxides (NOx). Carbon oxide. Hydrocarbons.
<b>Hazardous Polymerization:</b>	None under normal processing. Hazardous polymerization does not occur. Explosive material under shock conditions.

**SECTION 11 – TOXICOLOGICAL INFORMATION****Acute Toxicity**

<b>Product Information:</b>	Irritating to eyes. May cause skin irritation. Harmful if swallowed.
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Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ammonium Nitrate	2217 mg/kg Rat	3000 mg/kg Rabbit	88.8 mg/L Rat 4 h
Sodium Nitrate	1267-4300 mg/kg Rat		
Mineral Oil	4300 mg/kg Rat		

<b>Subchronic Toxicity (28 Days):</b>	Sodium Nitrate; Ammonium Nitrate: Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and, possibly shock.
<b>Chronic Toxicity:</b>	May cause methemoglobinemia.
<b>Carcinogenicity:</b>	The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by TNTP (National Toxicology Program).
<b>Mutagenic effects:</b>	There is no evidence of mutagenic potential.
<b>Irritation:</b>	Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons.
<b>Reproductive effects:</b>	No information is available and no adverse reproductive effects are anticipated.
<b>Developmental effects:</b>	No information is available and no adverse developmental effects are anticipated.

**Target Organ:** Eyes, skin, respiratory system, blood, liver, kidneys, endocrine system, immune system, urinary tract, & gastrointestinal tract (GI).

## SECTION 12 – ECOLOGICAL INFORMATION

**Ecotoxicity effects:** Dissolves slowly in water. Harmful to aquatic life at low concentrations.  
Environmental Effects: Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Chemical Name	Freshwater Algae Data	Freshwater Fish Species Data	Microtox Data	Water Flea Data	log Pow
Sodium Nitrate					-3.8

**Persistence/Degradability:** Some water resistance but soluble with extended time periods.  
**Mobility in Environmental media:** Dissolves slowly in water

## SECTION 13 – DISPOSAL CONSIDERATIONS

**Waste Disposal Method:** Burn under supervision of an expert at an explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an Orica Technical Representative.

## SECTION 14 – TRANSPORT INFORMATION

**DOT Proper Shipping Name:** Explosive, blasting type E  
**Hazard Class:** 1.5D  
**UN-No:** UN0332  
**Packing group:** II  
**TDG Proper Shipping Name:** Explosive, blasting type E  
**Hazard Class:** 1.5D  
**UN-No:** UN0332  
**Packing group:** II

**Transportation Emergency Telephone Number:** 1-877-561-3636 or CHEMTREC: 1-800-424-9300

## SECTION 15 – REGULATORY INFORMATION

**CANADIAN CLASSIFICATION:** This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

**WHMIS hazard class:** This product is an explosive and is not regulated by WHMIS.

### USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements, Ammonium Nitrate (6484-52-2), Sodium Nitrate (7631-99-4) & Mineral Oil (64742-53-6).

### SARA 311/312 Hazardous Categorization

**Acute Health Hazard:** Yes  
**Chronic Health Hazard:** Yes  
**Fire Hazard:** No  
**Reactive Hazard:** Yes  
**Sudden Release of Pressure Hazard:** Yes

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

**Other Regulations/Legislations which apply to this product:** New Jersey Right-to-Know, Pennsylvania Right-to-Know, Massachusetts Right-to-Know, Rhode Island Right-to-Know, Florida, New Jersey Special Health Hazard Substance List, Minnesota Hazardous Substance List, California Director's List of Hazardous Substances, California Proposition 65.

**TSCA:** Complies

**DSL:** Complies

**NDL:** Complies

The components in the product are on the following international inventory lists:

Chemical Name	TSCA	DSL	NDSL	ENCS	EINECS	ELINCS	CHINA	KECL	PICCS	AICS
Ammonium Nitrate	X	X	-	X	X	-	X	X	X	X
Sodium Nitrate	X	X	-	X	X	X	X	X	X	X
Mineral Oil	X	X	-	-	X	-	X	X	X	X

Legend: X – Listed

## SECTION 16 – OTHER INFORMATION

Prepared by: Safety Health & Environment  
303-268-5000

Preparation Date: 25-Mar-2006  
Revision Date: 18-Jul-2008

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End of MSDS



# Material Safety Data Sheet

Preparation Date: 22-Mar-2006

Revision Date: 28-Oct-2008

Revision Number: 1

## SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

**Supplier(s):**

Orica Canada Inc.  
Maple Street  
Brownsburg, QC  
For MSDS Requests: 450-533-4201

Orica USA Inc.  
33101 E. Quincy Avenue  
Watkins, CO 80137-9406  
For MSDS Requests: 1 303-268-5000

**Product Name:**

POWERDITCH™ 1000, POWERPRO™, POWERFRAC™, GELDYN™, COALITE™  
8SU, DYNASHEAR™, GEL COALITE™ Z, & XACTEX™

**Product Code:**

40053

**Alternate Name(s):**

Not available

**UN-No:**

UN0081

**Recommended Use:**

A detonator-sensitive gelatin explosive.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL: THE ORICA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636. IN THE U.S. CALL: CHEMTREC 1-800-424-9300. IN THE U.S.: FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF 1-800-800-3855. FORM ATF F 5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

## SECTION 2 – HAZARD IDENTIFICATION

**Emergency Overview:**

Risk of explosion by shock, fire or other sources of ignition. Very toxic if swallowed. Irritating to eyes, respiratory system and skin. Oxidizing agent.

**Appearance:**  
Light pink

**Physical State:**  
Semi-Solid

**Odor:**  
Characteristic

## SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Weight %
Ammonium Nitrate	6484-52-2	0-75
Sodium Nitrate	7631-99-4	0-50
Ethylene glycol, Dinitrate	628-96-6	8-76
Sulphur	7704-34-9	0-4
Nitroglycerin	55-63-0	1-20
Nitrocellulose	9004-70-0	0-6

## SECTION 4 – FIRST AID MEASURES

**General Advice:**

In case of accident or if you feel unwell, seek medical advice IMMEDIATELY (show the product label where possible).

**Eye Contact:**

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediate medical attention is required.

**Skin Contact:**

Wash off immediately with soap and plenty of water, removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

**Inhalation:**

Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.

**Ingestion:**

Immediate medical attention is required. Do not induce vomiting. Clean mouth with water and afterwards drink plenty of water. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Never give anything by mouth to and unconscious person.

**Notes to physician:** Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

## SECTION 5 – FIRE-FIGHTING MEASURES

**Flammable properties:** Not itself combustible but assists fire in burning materials. The product does not flash. Explosive power: 337 kJ/100 g.

**Suitable extinguishing media:** DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Evacuate surrounding areas to a predetermined safe location no less than 2500 feet (800 meters) in all directions. When controlling fire before involvement of explosives, fire-fighters should wear positive pressure self-containing breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate.

**Unsuitable extinguishing media:** DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. Attempts to smother a fire involving this product will be ineffective as it is its own oxygen source. Smother this product could lead to decomposition and explosion. This product is more sensitive to detonation if contaminated with organic or oxidisable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible.

**Specific hazards arising from the chemical:** This product is a high explosive with mass detonation hazard. DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors.

**Protective equipment and precautions for firefighters:** As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

## SECTION 6 – ACCIDENTAL RELEASE MEASURES

**Methods for containment:** Contain or absorb leaking putty with sand or earth or other suitable substance.

**Methods for cleaning up:** Avoid the use of metal tools containing iron and/or copper. Be careful to avoid shock, friction, and contact with grit. Collect product for recovery or disposal. For release to land, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Collect contaminated soil and water, and absorbent for proper disposal. Notify applicable government authority if release is reportable or could adversely affect the environment.

## SECTION 7 – HANDLING AND STORAGE

**Handling:** This product is an explosive and should only be used under the supervision of trained personnel. The use of coveralls is recommended. Use good industrial hygiene and housekeeping practices. Keep away from open flames, hot surfaces and sources of ignition.

**Storage:** Store under moderate temperatures recommended by a technical services representative. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, spark and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials; combustibles, and sources of heat. Keep away from incompatibles. Ideal storage temperature is 10-27 °C (50-80 °F). Do not expose sealed containers to temperatures above 40 °C (104 °F).

## SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium Nitrate	10 mg/cu m (nuisance dust)	NA	
Ethylene glycol, Dinitrate	TWA: 0.05 ppm Skin	Ceiling: 0.2 ppm Ceiling: 1 mg/ m <sup>3</sup> Skin	
Nitroglycerin	(TWA skin) 0.46 mg/ cu m	Ceiling: 0.2 ppm Ceiling: 2 mg/ m <sup>3</sup> Skin	

**Other exposure guidelines:** Ammonium Nitrate: ORICA Guideline 5 mg/m<sup>3</sup> (internal TWA)

**Engineering Measures:** No information available.

**Personal Protective Equipment**

**Eye/Face Protection:** Face-shield. Tightly fitting safety goggles.

**Skin Protection:** User should verify impermeability under normal conditions of use prior to general use. Impervious gloves. Nitrile Rubber.

**Respiratory Protection:** In case of insufficient ventilation wear suitable respiratory equipment. A NIOSH-approved respirator, if required.

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety practice. Recommendations listed in this section indicate the type of equipment, which will provide protection against over exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

## SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Light pink	<b>Odor:</b>	Characteristic
<b>Physical State:</b>	Semi-Solid	<b>Viscosity:</b>	No information available
<b>pH:</b>	7	<b>Flash Point:</b>	> 100°C
<b>Autoignition Temperature:</b>	-222°C (liquid NG) >=100>=212	<b>Boiling Point/Range:</b>	Not available
<b>Melting Point/Range:</b>	Not available	<b>Flammable Limits (Upper):</b>	Not applicable
<b>Flammable Limits (Lower):</b>	Not applicable	<b>Explosion Power:</b>	No data available
<b>Specific Gravity:</b>	085- 1.48 g/cc	<b>Water Solubility:</b>	In soluble in water
<b>Other Solubility:</b>	Slightly soluble in standard organic solvents	<b>Vapor Pressure:</b>	Not applicable
<b>Oxidizing Properties:</b>	Oxidizer	<b>Partition Coefficient (n-octanol/water):</b>	No data available

## SECTION 10 – STABILITY AND REACTIVITY

**Stability:** Stable under normal conditions. Decomposition Temperature: Ammonium Nitrate will spontaneously decompose at 210°C (410°F). NG explodes at 222°C (431.6°F)

**Conditions to avoid:** Keep away from open flames, hot surfaces and sources of ignition.

**Incompatible materials:** Avoid oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles. Strong oxidizing and reducing agents.

**Hazardous decomposition products:** The following toxic decomposition products may be released. At temperatures above 210°C, decomposition may be explosive, especially if confined. Nitrogen oxides (NOx). Carbon oxide. Hydrocarbons.

**Hazardous Polymerization:** None under normal processing. Hazardous polymerization does not occur. Explosive material under shock conditions.

## SECTION 11 – TOXICOLOGICAL INFORMATION

### Acute Toxicity

**Product Information:** Irritating to eyes. May cause skin irritation. Harmful if swallowed.

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ammonium Nitrate	2217 mg/kg Rat	3000 mg/kg Rabbit	88.8 mg/L Rat 4 h
Sodium Nitrate	1267-4300 mg/kg Rat		
Ethylene glycol, Dinitrate	460 mg/ kg Rat 540 mg/ kg Mouse		
Nitroglycerin	105 mg/ kg Rat 115 mg/ kg Mouse	280 mg/ kg Rabbit	
Nitrocellulose	5 g/ kg Mouse 5 g/ kg Rat		

**Subchronic Toxicity (28 Days):** Sodium Nitrate; Ammonium Nitrate: Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and, possibly shock.

Chronic Toxicity: May cause methemoglobinemia.  
 Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by TNTP (National Toxicology Program).

Mutagenic effects: There is no evidence of mutagenic potential.  
 Irritation: Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons.

Reproductive effects: No information is available and no adverse reproductive effects are anticipated.  
 Developmental effects: No information is available and no adverse developmental effects are anticipated.  
 Target Organ: Eyes, skin, respiratory system, blood, liver urinary tract, & gastrointestinal tract (GI).  
 Other Adverse Effects: Prolonged or repeated exposure to organic nitrates may develop a tolerance due to chronic dilation of the blood vessels. This tolerance disappears rapidly after a few days away from exposure and withdrawal symptoms consisting of angina and heart attack have been reported in chronically exposed workers. Another type of tolerance loss is the "Monday morning disease", where workers experience headaches, dizziness, postural weakness and other symptoms.

## SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity effects: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Chemical Name	Freshwater Algae Data	Freshwater Fish Species Data	Microtox Data	Water Flea Data	log Pow
Sodium Nitrate					-3.8

Persistence/Degradability: Nitroglycerin is water-insoluble and remains explosive.  
 Mobility in Environmental media: Dissolves slowly in water.

## SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Method: Burn under supervision of an expert at an explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an Orica Technical Representative.  
 US EPA Waste Number: No data available on product.

Chemical Name	RCRA	RCRA- Basis for listing	RCRA- D Series Wastes	RCRA- U Series Wastes
Nitroglycerin -55-63-0	Waste number P081			

## SECTION 14 – TRANSPORT INFORMATION

DOT Proper Shipping Name: Explosive Blasting Type A  
 Hazard Class: 1.1D  
 UN-No: UN0081  
 Packing group: II  
 TDG Proper Shipping Name: Explosive Blasting Type A  
 Hazard Class: 1.1D  
 UN-No: UN0081  
 Packing group: II

Transportation Emergency Telephone Number: 1-877-561-3636 or CHEMTREC: 1-800-424-9300

## SECTION 15 – REGULATORY INFORMATION

CANADIAN CLASSIFICATION: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

WHMIS hazard class: This product is an explosive and is not regulated by WHMIS.  
 USA CLASSIFICATION:



SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements, Ammonium Nitrate (6484-52-2), Sodium Nitrate (7631-99-4), Nitroglycerin (55-63-0), Nitrocellulose (9004-70-0), Sulphur (7704-34-9), & Ethylene Glycol, Dinitrate (628-96-6)

#### SARA 311/312 Hazardous Categorization

Acute Health Hazard: Yes  
 Chronic Health Hazard: Yes  
 Fire Hazard: Yes  
 Reactive Hazard: Yes  
 Sudden Release of Pressure Hazard: No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

Other Regulations/Legislations which apply to this product: New Jersey Right-to-Know, Pennsylvania Right-to-Know, Massachusetts Right-to-Know, Rhode Island Right-to-Know, Florida, New Jersey Special Health Hazard Substance List, Minnesota Hazardous Substance List, California Director's List of Hazardous Substances, California Proposition 65.

TSCA: Complies

DSL: Complies

NDSL: Complies

The components in the product are on the following international inventory lists:

Chemical Name	TSCA	DSL	NDSL	ENCS	EINECS	ELINCS	CHINA	KECL	PICCS	AICS
Ammonium Nitrate	X	X	-	X	X	-	X	X	X	X
Sodium Nitrate	X	X	-	X	X	X	X	X	X	X
Ethylene Glycol, Dinitrate	X	X	-	-	X	-	-	X	-	X
Sulphur	X	X	-	X	X	X	X	X	X	X
Nitroglycerin	X	X	-	X	X	-	-	X	X	X
Nitrocellulose	X	X	-	X	-	-	X	X	X	X

Legend: X – Listed

#### SECTION 16 – OTHER INFORMATION

Prepared by: Safety Health & Environment  
 303-268-5000

Preparation Date: 22-Mar-2006  
 Revision Date: 28-Oct-2008

The information contained herein is offered only as guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

End of MSDS



# Material Safety Data Sheet

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FOR 24 HOUR EMERGENCY, CALL CHEMTREC (USA) 800-424-9300  
CANUTEC (CANADA) 613-996-6666

MSDS # 1108  
Date 08/05/08

Supersedes  
MSDS # 1108 01/23/06

## SECTION I - PRODUCT IDENTIFICATION

### Trade Name(s):

DYNO® CORD SENSITIVE BOOSTERS - CS35, CS45, CS90, CS135

TROJAN® SPARTAN®  
TROJAN® SPARTAN® Slider  
TROJAN® Stinger  
TROJAN® NB  
TROJAN® NB UNIVERSAL  
TROJAN® Twinplex

Product Class: Cast Boosters

Product Appearance & Odor: Tan to brown solid with no odor. May also be silvery gray.  
Packaged in paper or plastic tube.

OT Hazard Shipping Description: Booster 1.1D UN0042 II

NFPA Hazard Classification: Not Available (See Section IV - Special Fire Fighting Procedures)

## SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	% (Range)	<u>Occupational Exposure Limits</u>	
			ACGIH TLV-TWA	OSHA PEL-TWA
Pentaerythritol Tetranitrate (PETN)	78-11-5	35-70	None Established	None Established
Trinitrotoluene	118-96-7	30-50	0.1 mg/m <sup>3</sup> (skin)	1.5 mg/m <sup>3</sup> (skin)
RDX	121-82-4	0-25	0.5 mg/m <sup>3</sup> (skin)	1.5 mg/m <sup>3</sup> (skin)
HMX	2691-41-0	0-5	None Established	None Established
Aluminum	7429-90-5	0-15	10 mg/m <sup>3</sup> (dust)	15 mg/m <sup>3</sup> (total)

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

# Material Safety Data Sheet

## SECTION III - PHYSICAL DATA

Melting Point: 176° F (80° C) (TNT)  
Vapor Density: Not applicable  
Percent Volatile by Volume: Not applicable  
Evaporation Rate (Butyl Acetate = 1): Not applicable

Vapor Pressure: 0.042mm Hg at 80° C (TNT)  
Density: 1.55 - 1.65 g/cc  
Solubility in Water: < 0.01%

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not applicable  
Extinguishing Media: (See Special Fire Fighting Procedures section).  
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.  
Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

## SECTION V - HEALTH HAZARD DATA

### Effects of Overexposure

**Eyes:** Particulates in the eye may cause irritation, redness, and tearing. Prolonged or repeated contact may cause cataracts, optic neuritis, blurred vision or amblyopia.

**Skin:** Prolonged contact may cause irritation, severe eczema and sensitization dermatitis. TNT may be absorbed through the skin, which may be indicated by orange staining on exposed skin. See systemic effects below.

**Ingestion:** Harmful if swallowed. See systemic effects below.

**Inhalation:** Inhalation of dusts may cause irritation, sneezing or coughing. See systemic effects below.

**Systemic or Other Effects:** TNT is an irritant, neurotoxin, hepatotoxin, nephrotoxin and bone marrow depressant. Although exposure is unlikely, acute or chronic exposure may cause sensitization dermatitis, headache, dizziness, jaundice, lethargy, or problems with the liver or blood such as toxic nephritis, aplastic anemia, hemolytic anemia or methemoglobin formation. PETN is a known coronary vasodilator, and ingestion or inhalation may result in a lowering of blood pressure, headache or faintness, and a decreased tolerance for grain alcohol. Repeated over-exposure may result in chest pains in the absence of exposure.

### Emergency and First Aid Procedures

**Eyes:** Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

**Skin:** Remove contaminated clothing. Wash skin thoroughly with soap and water.

**Ingestion:** Seek medical attention.

**Inhalation:** In case of irritation, remove to fresh air. Seek medical attention if chronic symptoms occur.

**Special Considerations:** None.

## SECTION VI - REACTIVITY DATA

**Stability:** Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

**Conditions to Avoid:** Keep away from heat, flame, friction, impact, ignition sources and strong shock.

**Materials to Avoid (Incompatibility):** Corrosives (strong acids and bases or alkalis).

**Hazardous Decomposition Products:** Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO)

**Hazardous Polymerization:** Will not occur.

# Material Safety Data Sheet

## SECTION VII - SPILL OR LEAK PROCEDURES

**Steps to be taken in Case Material is Released or Spilled:** Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State and local spill reporting requirements.

**Waste Disposal Method:** Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

## SECTION VIII - SPECIAL PROTECTION INFORMATION

**Ventilation:** Not required for normal handling.

**Respiratory Protection:** None normally required.

**Protective Clothing:** Non-permeable gloves and work clothing that reduce skin contact are recommended.

**Eye Protection:** Safety glasses are recommended.

**Other Precautions Required:** None.

## SECTION IX - SPECIAL PRECAUTIONS

**Precautions to be taken in handling and storage:** Store in cool, dry location. Store in compliance with all Federal, State and local regulations. Keep away from heat, flame, ignition sources or strong shock.

**Precautions to be taken during use:** Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

**Other Precautions:** It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.

## SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

<u>Chemical Name</u>	<u>CAS Number</u>	<u>% By Weight</u>
None Applicable		

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# Material Safety Data Sheet

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CANUTEC (CANADA) 613-996-6666

MSDS # 1030

Date 09/05/07

Supersedes

MSDS # 1030 03/27/07

## SECTION I - PRODUCT IDENTIFICATION

**Trade Name(s):**

DYNO <sup>®</sup> AP	POWERMITE <sup>®</sup>
DYNO <sup>®</sup> AP PLUS	POWERMITE <sup>®</sup> AP
DYNO <sup>®</sup> AP PLUS LD	POWERMITE <sup>®</sup> Canadian
DYNO <sup>®</sup> E5	POWERMITE <sup>®</sup> LD
DYNO <sup>®</sup> MC	POWERMITE <sup>®</sup> LD PLUS
DYNO <sup>®</sup> MC PLUS	POWERMITE <sup>®</sup> PLUS
DYNO <sup>®</sup> SL	POWERMITE <sup>®</sup> RAISE BOMB™
DYNO <sup>®</sup> SL PLUS	POWERMITE <sup>®</sup> SL
DYNO <sup>®</sup> TX	POWERMITE <sup>®</sup> SL PLUS
DYNO <sup>®</sup> XTRA	
DYNOSPLIT <sup>®</sup> AP	

**Product Class:** Emulsion Explosives, Packaged**Product Appearance & Odor:** White or pink opaque semi-solid, which will appear gray if product contains aluminum.  
Little or no odor. Typically paper or plastic chub packaging.**DOT Hazard Shipping Description:** Explosive, Blasting, Type E 1.1D UN0241 II**NFPA Hazard Classification:** Not Available (See Section IV - Special Fire Fighting Procedures)

## SECTION II - HAZARDOUS INGREDIENTS

<u>Ingredients:</u>	<u>CAS#</u>	<u>% (Range)</u>	<u>Occupational Exposure Limits</u>	
			<u>ACGIH TLV-TWA</u>	<u>OSHA PEL-TWA</u>
Ammonium Nitrate	6484-52-2	60-80	None	None
Sodium Nitrate	7631-99-4	10-18	None	None
Aluminum	7429-90-5	0-15	10 mg/m <sup>3</sup> (dust)	15 mg/m <sup>3</sup> (total)
Mineral Oil	64742-35-4	0-3	5 mg/m <sup>3</sup> (mist)	None

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

# Material Safety Data Sheet

## SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable

Vapor Pressure: Not Applicable

Vapor Density: (Air = 1) Not Applicable

Density: 0.95-1.25 g/cc

Percent Volatile by Volume: <20 (water)

Solubility in Water: Product partially dissolves very slowly in water.

Evaporation Rate (Butyl Acetate = 1): <1

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >100°C

Flammable Limits: Not Applicable

Extinguishing Media: (See Special Fire Fighting Procedures section.)

Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

## SECTION V - HEALTH HAZARD DATA

### Effects of Overexposure

Eyes: May cause irritation, redness and tearing.

Skin: Prolonged contact may cause irritation.

Ingestion: Large amounts may be harmful if swallowed.

Inhalation: Not a likely route of exposure.

Systemic or Other Effects: None known.

### Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists seek medical attention.

Skin: Remove contaminated clothing. Wash with soap and water.

Ingestion: Seek medical attention.

Inhalation: If irritation occurs, remove to fresh air.

Special Considerations: None.

## SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantity.

Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.

Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).

Hazardous Decomposition Products: Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO)

Hazardous Polymerization: Will not occur.



# Material Safety Data Sheet

## SECTION VII - SPILL OR LEAK PROCEDURES

**Steps to be taken in Case Material is Released or Spilled:** Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements.

**Waste Disposal Method:** Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

## SECTION VIII - SPECIAL PROTECTION INFORMATION

**Ventilation:** Not required for normal handling.

**Respiratory Protection:** None normally required.

**Protective Clothing:** Gloves and work clothing that reduce skin contact are suggested.

**Eye Protection:** Safety glasses are recommended.

**Other Precautions Required:** None.

## SECTION IX - SPECIAL PRECAUTIONS

**Precautions to be taken in handling and storage:** Store in cool, dry, well-ventilated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flame, ignition sources and strong shock.

**Precautions to be taken during use:** Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

**Other Precautions:** It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

## SECTION X - SPECIAL INFORMATION

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listing of the previously referenced regulation should be reviewed.

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# Material Safety Data Sheet

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CANUTEC (CANADA) 613-996-6666

MSDS # 1009  
Date 01/15/09

Supersedes  
MSDS # 1009 08/13/08

## SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): ANFO  
DYNOMIX™, DYNOMIX™ (U.G.)  
DYNOMIX™ WR  
DYNOMIX™ HD  
FRAGMAX®

Product Class: ANFO, Bulk or Packaged

Product Appearance & Odor: Pale, oil-covered prills with fuel oil odor.

Hazard Shipping Description (U.S. DOT and Canada TDGR)

For ANFO, DYNOMIX™, DYNOMIX™ (U.G.) NA0331 Ammonium nitrate-fuel oil mixture 1.5D II  
UN0331 Explosive, blasting, type B 1.5D II

Note: Either description is acceptable, but if already packaged, refer to packaging for which description to use.

or DYNOMIX™ WR: UN0331 Explosive, blasting, type B 1.5D II  
For DYNOMIX™ HD (Canada only): UN0082 Explosive, blasting, type B 1.1D II

NFPA Hazard Classification: Not Available (See Section IV - Special Fire Fighting Procedures)

## SECTION II - HAZARDOUS INGREDIENTS

<u>Ingredients:</u>	<u>CAS#</u>	<u>% (Range)</u>	<u>Occupational Exposure Limits</u>	
			<u>ACGIH TLV-TWA</u>	<u>OSHA PEL-TWA</u>
Ammonium Nitrate	6484-52-2	92-95	None <sup>1</sup>	None <sup>2</sup>
Fuel Oil	68476-34-6	4-7	100 ppm	None
Guar Gum*	9000-30-0	0-3	None <sup>1</sup>	None <sup>2</sup>

<sup>1</sup> Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m<sup>3</sup>; respirable fraction, 5 mg/m<sup>3</sup>.

<sup>2</sup> Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m<sup>3</sup>; respirable part., 3 mg/m<sup>3</sup>.

\* DYNOMIX™ WR is the only product containing guar gum.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

# Material Safety Data Sheet

## SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable  
Vapor Density: > 1  
Percent Volatile by Volume: < 8 (Fuel oil)  
Evaporation Rate (Butyl Acetate = 1): < 1

Vapor Pressure: <5 mm Hg @ 75° F  
Density: 0.8 to 1.05 g/cc bulk density  
Solubility in Water: Ammonium Nitrate component completely soluble

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >120° F (49°C) Flammable Limits: Not Available  
Extinguishing Media: (See Special Fire Fighting Procedures section.)  
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.  
Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

## SECTION V - HEALTH HAZARD DATA

### Effects of Overexposure

Eyes: May cause irritation, redness and tearing.  
Skin: Prolonged contact may cause irritation.  
Ingestion: Large amounts may be harmful if swallowed.  
Inhalation: May cause dizziness, nausea or intestinal upset.  
Systemic or Other Effects: None known.

### Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least 15 minutes. If irritation persists, seek medical attention.  
Skin: Wash with soap and water.  
Ingestion: Seek medical attention.  
Inhalation: Remove to fresh air.  
Special Considerations: None.

## SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.  
Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.  
Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).  
Hazardous Decomposition Products: Carbon Monoxide (CO) and Nitrogen Oxides (NO<sub>x</sub>)  
Hazardous Polymerization: Will not occur.



# Material Safety Data Sheet

## SECTION VII - SPILL OR LEAK PROCEDURES

**Steps to be taken in Case Material is Released or Spilled:** In case of fire evacuate area not less than 2,500 feet in all directions. Protect from all ignition sources. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal; State and local spill reporting requirements.

**Waste Disposal Method:** Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

## SECTION VIII - SPECIAL PROTECTION INFORMATION

**Ventilation:** Not required for normal handling. Forced ventilation may be necessary where natural ventilation is limited.

**Respiratory Protection:** None normally required. In a dusty environment, or in hot, enclosed areas, respiratory protection may be needed.

**Protective Clothing:** Gloves and work clothing that reduce skin contact are suggested.

**Eye Protection:** Safety glasses are recommended.

**Other Precautions Required:** None.

## SECTION IX - SPECIAL PRECAUTIONS

**Precautions to be taken in handling and storage:** Store in cool, dry, well-ventilated locations. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources and strong shock.

**Precautions to be taken during use:** Avoid breathing the fumes from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

**Other Precautions:** It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library publications.

## SECTION X - SPECIAL INFORMATION

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listing of the previously referenced regulation should be reviewed.

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# Material Safety Data Sheet

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CANUTEC (CANADA) 613-996-6666

MSDS # 1084

Date 08/13/08

Supersedes

MSDS # 1084 02/07/05

## SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): DYNOSPLIT® C

Product Class: Pre-split Explosives, Water Gel with Detonating Cord

Product Appearance &amp; Odor: Odorless aluminum color gel packaged in polyethylene cartridges.

DOT Hazard Shipping Description: UN0241 Explosive, blasting, type E 1.1D II

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

## SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	% (Range)	ACGIH TLV-TWA
Ammonium Nitrate	6484-52-5	<65	No Value Established
Sodium Nitrate	7631-99-4	<20	No Value Established
Sodium Perchlorate	7601-89-0	<7	No Value Established
Aluminum	7429-90-5	<7	10 mg/m <sup>3</sup>
Reaction Products of:		<20	No Value Established
Hexamethylene Tetramine (HMT)	100-97-0		
Nitric Acid	7697-37-2		

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

## SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable

Vapor Density: Not Applicable

Percent Volatile by Volume: &lt;20 (water)

Evaporation Rate (Ether = 1): Not Applicable

Vapor Pressure: Not Applicable

Density: 1.2 - 1.3 g/cc

Solubility in Water: Product mostly dissolves  
very slowly over time.

# Material Safety Data Sheet

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Extinguishing Media: See Special Fire Fighting Procedures Section.

Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

## SECTION V - HEALTH HAZARD DATA

### Effects of Overexposure

Eyes: May cause irritation, redness and tearing.

Skin: Prolonged contact may cause irritation.

Ingestion: Not a likely route of exposure. Swallowing large quantities may cause toxicity characterized by dizziness, bluish skin coloration, methemoglobinemia and unconsciousness, abdominal spasms, nausea, and pain.

Inhalation: Not a likely route of exposure.

Systemic or Other Effects: *Perchlorate*: Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone. The National Academy of Sciences (NAS) has reviewed the toxicity of perchlorate and has concluded that even the most sensitive populations could ingest up to 0.7 microgram perchlorate per kilogram of body weight per day without adversely affecting health. The USEPA must establish a maximum contaminant level (MCL) for perchlorate in drinking water by 2007, and this study by NAS may result in a recommendation of about 20 ppb for the MCL.

### Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

Skin: Remove contaminated clothing. Wash skin thoroughly with soap and water.

Ingestion: Seek medical attention.

Inhalation: Remove to fresh air. If irritation persists, seek medical attention.

Special Considerations: None.

## SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.

Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis). Reacts with strong alkalis to liberate ammonia and amines.

Hazardous Decomposition Products: Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO), Ammonia (NH<sub>3</sub>) or Hydrogen (H<sub>2</sub>).

Hazardous Polymerization: Will not occur.

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## SECTION VII - SPILL OR LEAK PROCEDURES

**Steps to be taken in Case Material is Released or Spilled:** Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements.

**Waste Disposal Method:** Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

## SECTION VIII - SPECIAL PROTECTION INFORMATION

**Ventilation:** Not required for normal handling.

**Respiratory Protection:** None normally required.

**Protective Clothing:** Gloves and work clothing which reduce skin contact are recommended.

**Eye Protection:** Safety glasses are recommended.

**Other Precautions Required:** None.

## SECTION IX - SPECIAL PRECAUTIONS

**Precautions to be taken in handling and storage:** Store in cool, dry, well-ventilated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flames, ignition sources and strong shock.

**Precautions to be taken during use:** Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

**Other Precautions:** It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library publications.

## SECTION X - SPECIAL INFORMATION

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listings of the previously referenced regulation should be reviewed.

### Disclaimer

Dyno Nobel Inc. and its subsidiaries disclaim any warranties with respect to this product, the safety or suitability thereof, the information contained herein, or the results to be obtained, whether express or implied, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND/OR OTHER WARRANTY. The information contained herein is provided for reference purposes only and is intended only for persons having relevant technical skills. Because conditions and manner of use are outside of our control, the user is responsible for determining the conditions of safe use of the product. Buyers and users assume all risk, responsibility and liability whatsoever from any and all injuries (including death), losses, or damages to persons or property arising from the use of this product or information. Under no circumstances shall either Dyno Nobel Inc. or any of its subsidiaries be liable for special, consequential or incidental damages or for anticipated loss of profits.

# **Electronic Blasting Systems**



# Material Safety Data Sheet

Based on available information, not classified as hazardous according to criteria of NOHSC.  
Classified as Dangerous Goods by the criteria of the Australian Code for the Transport of Explosives by Road and Rail.

## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: **UNI Tronic™**

Synonyms: Electronic detonators - UNI Tronic™  
Supplier: Orica Australia Pty Ltd  
ABN: 004 117 828  
Street Address: 1 Nicholson Street  
Melbourne 3000  
Australia  
Telephone Number: +61 3 9665 7111  
Facsimile: +61 3 9665 7937

Emergency Telephone: **1 800 033 111 (ALL HOURS)**

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

Product Description: Article. Initiator for explosive charges. Metal shell (copper or aluminum) with attached copper wires. The primary and secondary explosive powders are contained within the shell. Odourless.

Components / CAS Number	Proportion	Risk Phrases
Pentaerythritol tetranitrate (PETN) 78-11-5	<1%	R3
Lead azide 13424-46-9	<0.1%	R3,R20/22,R33,R61(1),R62(3)
Tin 7440-31-5	<0.1%	Non hazardous
Other minor ingredients	<0.5%	-
Metal components (copper/aluminium) of article	>90%	-

## 3. HAZARDS IDENTIFICATION

Risk Phrases: Risk of explosion by shock, friction, fire or other sources of ignition.

Poisons Schedule: None allocated.

## 4. FIRST AID MEASURES

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Substance No: **000000009036**

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For advice, contact a Poisons Information Centre (Phone eg. Australia 131 126; New Zealand 0 800 764766) or a doctor. Construction of the product normally prevents contact with explosive component, however, in the event of exposure:

**Inhalation:** In the case of inhalation of blasting fumes: Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. Seek medical advice if effects persist.

**Skin Contact:** If skin contact occurs, remove contaminated clothing and wash skin with running water. If irritation occurs seek medical advice.

**Eye Contact:** If in eyes, wash out immediately with water. In all cases of eye contamination it is a sensible precaution to seek medical advice.

**Ingestion:** Rinse mouth with water. Get to a doctor or hospital quickly.

**Notes to physician:** Treat symptomatically. Detonator assemblies are explosive - handle with care. Explosive material containing lead. Long term exposure to detonation fumes may result in lead poisoning.

## 5. FIRE FIGHTING MEASURES

**Specific Hazards:** Explosive material. Avoid all ignition sources. Risk of explosion by shock, friction, fire or other sources of ignition. Avoid stray currents.

**Fire-fighting advice:** Explosive. Severe detonation hazard when exposed to heat. On burning will emit toxic fumes, including those of lead. In case of small fire where the actual explosive is not involved, carefully remove explosive to a safe distance, otherwise evacuate area immediately and allow to burn.

**Suitable Extinguishing Media:** Water jets.

## 6. ACCIDENTAL RELEASE MEASURES

Shut off all possible sources of ignition. Collect and seal in properly labelled containers. In the case of a transport accident notify the Police, Explosives Inspector and Orica Australia Pty Ltd (Telephone: 1800 033 111 -- 24 hour service) and/or Orica New Zealand Pty Ltd (Telephone: 0800 734 607 -- 24 hour service).

## 7. HANDLING AND STORAGE

**Handling advice:** Detonators are explosive - handle with care. Keep out of reach of children. Do NOT subject the material to impact, friction between hard surfaces nor to any form of heating.

**Storage advice:** Store away from sources of heat or ignition. Store material in a well ventilated magazine suitably licensed for Class 1.4S Explosives.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Occupational Exposure Limits:**  
No value assigned for this specific material by the National Occupational Health and Safety Commission. However, Exposure Standard(s) for constituent(s):

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Lead, inorganic dusts & fumes (as Pb): 8hr TWA = 0.15 mg/m<sup>3</sup>  
Copper dusts & mists (as Cu): 8hr TWA = 1 mg/m<sup>3</sup>  
Copper (fume): 8hr TWA = 0.2 mg/m<sup>3</sup>  
Aluminium (metal dust): 8hr TWA = 10 mg/m<sup>3</sup>  
Tin, metal: 8hr TWA = 2 mg/m<sup>3</sup>

TWA - The time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.

As published by the National Occupational Health and Safety Commission.

These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

### Engineering Control Measures:

When test firing, ensure ventilation is adequate and that air concentrations of components are controlled below quoted Exposure Standards. Natural ventilation should be adequate under normal use conditions.

### Personal Protective Equipment:

Orica Personal Protection Guide No. 1, 1998: A - OVERALLS, SAFETY SHOES.

No special personal protective equipment required. Containment of charge within metal tube prevents exposure.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Article
Colour:	Metallic
Odour:	Odourless
Solubility:	Insoluble in water.
Specific Gravity:	N Av
Relative Vapour Density (air=1):	N App
Vapour Pressure (20 °C):	N App
Flash Point (°C):	N App
Flammability Limits (%):	N App
% Volatile by Volume:	Nil
Solubility in water (g/L):	Nil

## 10. STABILITY AND REACTIVITY

**Stability:** Detonation may occur from impact, friction, excessive heating or by electrical energy from an extraneous source (lightning, static electricity, stray currents, galvanic electricity or electromagnetic radiation).  
Incompatible with acids and alkalis.

## 11. TOXICOLOGICAL INFORMATION

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The construction of these articles should prevent any chemical contamination. No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

**Ingestion:** No information available.  
**Eye contact:** May cause physical irritation.  
**Skin contact:** Contact with metal tube contents may result in irritation.  
**Inhalation:** Not a likely route of exposure due to the physical form of the product. Test firing of detonators in poorly ventilated areas can cause presence of lead fume in air. Lead fumes may be irritant to mucous membranes and respiratory tract.

### Long Term Effects:

Long term exposure to low concentrations of lead (by any route) may result in blood effects, anaemia, central and peripheral nervous system damage, gastrointestinal disturbances, renal injury, foetotoxicity, developmental deficiencies in neonates and children, and testicular damage including decreased sperm count.

### Toxicological Data:

No LD50 data available for the product.

Exposure to explosive charge material unlikely. The main hazard is the possibility of exposure to lead fumes when test firing detonators in a poorly ventilated area. The effects of lead poisoning may not be apparent immediately but significant absorption over a period of time may produce adverse effects as noted earlier due to accumulation of lead in the body.

## 12. ECOTOXICOLOGICAL INFORMATION

Avoid contaminating waterways.

## 13. DISPOSAL CONSIDERATIONS

For small quantities: Place in a blast hole and explode during blasting. Large quantities should be returned to Orica Australia Pty Ltd/Orica New Zealand Pty Ltd or be disposed of in conjunction with the Land Waste Management Authority. Do not move detonators showing obvious signs of deterioration. Contact Orica Australia Pty Ltd or the relevant State Dangerous Goods Branch.

## 14. TRANSPORT INFORMATION

### Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Code for the Transport of Explosives by Road and Rail.

**UN No:** 0456  
**Class-primary** 1.4 S Explosive  
**Proper Shipping Name:** DETONATORS, ELECTRIC

**Hazchem Code:** 1[Y]E

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## Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.

UN No: 0456  
Class-primary: 1.4 S Explosive  
Proper Shipping Name: DETONATORS, ELECTRIC

## Air Transport

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air.

UN No: 0456  
Class-primary: 1.4 S Explosive  
Proper Shipping Name: DETONATORS, ELECTRIC

## 15. REGULATORY INFORMATION

Classification: Based on available information, not classified as hazardous according to criteria of NOHSC.  
Risk Phrase(s): R2: Risk of explosion by shock, friction, fire or other sources of ignition.

Poisons Schedule: None allocated.

All the constituents of this material are listed on the Australian Inventory of Chemical Substances (AICS).

## 16. OTHER INFORMATION

This material safety data sheet has been prepared by SH&E Shared Services, Orica.

Reason(s) for Issue:  
First Issue Primary MSDS

This MSDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Orica Limited cannot anticipate or control the conditions under which the product may be handled, each user must, prior to handling, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Orica representative or Orica Limited at the contact details on page 1.

Orica Limited's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is

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available upon request.

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